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Hegel and the World-Historical Unity of Science[1]

Peter Damerow and Wolfgang Lefèvre

ABSTRACT: This paper is based on a lecture Damerow and Lefèvre gave at a Hegel-Congress in 1982. It was first published in *Hegel-Jahrbücher* 1983 and discusses the concept and function of science from a historical materialist point of view. Starting from the dilemma of the Hegelian systematical view on science in terms of *Wissenschaft the* authors advance a critique as well as an apology of this notion to defend an internationalist view on scientific development and the emancipative notion of science against its reduction—either positivist or relativist—on the one hand and its capitalist subsumption on the other hand. In this way the text forestalls recent debates on decolonization as well as on the role of the sciences in the Anthropocene.

KEYWORDS: Hegel, science, world-history, world spirit, historical materialism, systems of knowledge, unity of science.

1. Translated by Cat Moir Wolfe, edited by Sascha Freyberg.
Editor's note: The following text touches on problems we still find important (note the internationalist view on scientific development and the emancipative notion of Science [*Wissenschaft*] versus its reduction). It is based on a lecture that Peter Damerow (1939–2011) and Wolfgang Lefèvre (1941–2025) gave at the XIV. Congress of the International Hegel-Society in Athens 1982 (*Weltgeist*). It was first published in German (Damerow and Lefévre 1983). The translation was done by Cat Moir Wolfe. For more biographical information on Damerow and Lefèvre, who both were active in the student movement in West-Berlin and later advanced the field of historical epistemology ath the Max Planck Institute for the History of Science, see http://damerow.mpiwg.de/doku.php/obituary and https://www.mpiwg-berlin.mpg.de/news/memoriam-wolfgang-lefevre-1941-2025. Also see Freyberg and Omodeo's introduction to (and Cat Moir Wolfe's translation of) Lefèvre's now classic study *Natural Theory and Mode of Production* published as the first initial volume of the new Political Epistemology book series (Lefèvre 2025): https://link.springer.com/content/pdf/bfm:978-3-032-02295-0/1.

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• *Correspondence: Sascha Freyberg*, Hamburg University.
• e-mail: sascha.freyberg@uni-hamburg.de
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Perhaps you had a similar experience to ours in preparing for this year's Hegel Congress. When we were asked by friends and colleagues what the general theme of the congress would be, we answered: "the world spirit," and the mildest response we received was indulgent laughter. No Hegelian concept seems as irredeemably outdated as that of the world spirit.

The suspicion that the term "world spirit" [*Weltgeist*] revives the worst excesses of speculative idealism also applies to the subject of our lecture, the unity of science [*Einheit der Wissenschaft*]. For even when restricted to the scientific spirit, the term "world spirit" seems unquestioningly to presuppose some of Hegel's most precarious theories. In particular, the following points could be raised:

1. Does it still make sense to speak of science and its world history as Hegel did? Does not Hegel's gigantic systemic construction itself provide striking proof that it is completely impossible to summarize modern science, differentiated as it is into individual disciplines, into a unified whole and to present it as a comprehensive system without doing it violence? Are such attempts not doomed to historical embarrassment?

2. When Hegel drafted his system encompassing all the sciences and their history, the fragmentation of science into individual disciplines had already become inevitable. Faced with this situation, Hegel saw himself confirmed in his view that only philosophy was capable of integrating the spirit of science into a unified whole. Thus, for example, he wrote the following about the relationship between physics and natural philosophy in his *Encyclopaedia of the Philosophical Sciences*: "The Philosophy of Nature takes up the material which physics has prepared for it empirically, at the point to which physics has brought it, and reconstitutes it, so that experience is not its final warrant and base. Physics must therefore work into the hands of philosophy, in order that the latter may translate into the Notion [*Begriff*] the abstract universal transmitted to it, by showing how this universal, as an intrinsically necessary whole, proceeds from the Notion" (Hegel 2004, 10). Can we seriously expect philosophical speculation to provide the individual sciences with binding answers to the overarching questions from which they—the individual sciences—based on empirical knowledge and hard empiricism, have programmatically turned away? Is this not rather an overstepping of philosophy's sphere of competence, against which the sciences are rightly fighting as bitterly as they once did against ecclesiastical paternalism? Should we not draw the general conclusion that any attempt by philosophy to integrate the sciences in the manner of Hegel is doomed to failure from the outset?

3. Hegel's universalist understanding of the scientific spirit also consisted in the fact that he regarded the historical development of philosophy and science from the outset and quite self-evidently as world history. It was just as

> self-evident for him, however, that the intellectual history of Europe, founded in antiquity and the Christian Occident, constitutes the goal of this world history as well as the standard by which philosophy's development must be evaluated. In his *Lectures on the History of Philosophy*, for example, Hegel briefly discusses the philosophy of the Chinese and Indians, but only in advance and outside his actual presentation of the history of philosophy: "The first Philosophy in order is the so-called Oriental, which, however, does not enter into the substance or range of our subject as represented here. Its position is preliminary, and we only deal with it at all in order to account for not treating it at greater length, and to show in what relation it stands to Thought and to true Philosophy" (Hegel 1995, 111). In the oriental spirit according to Hegel, the "destruction of all that is particular either is an illimitable, the exaltitude of the East, or, in so far as that which is posited and determined for itself is known, it is a dry, dead understanding, which cannot take up the speculative Notion into itself [...]. We thus find only dry understanding amongst the Easterns, a mere enumeration of determinations, a logic like the Wolffian of old" (119). "So science and culture, the compiling of information, is in the main empirical in nature, not theoretical, not a free interest of thought as such; instead the sciences essentially stand to serve the utility and benefit of the state" (Hegel 2011, 239). Hegel gives a historical reason for his view. The "principle of individual freedom" first emerges in "the Greek and still more the Christian element" (1995, 117). And for Hegel, this principle consists in a world-historical turning point. "[M]an, who in himself is rational, does not at first seem to have got further on since he became rational for himself—what is implicit having merely retained itself—the difference is quite enormous: no new content has been produced, and yet this form of being for self makes all the difference. The whole variation in the development of the world in history is founded on this difference. This alone explains how since all mankind is naturally rational, and freedom is the hypothesis on which this reason rests, slavery yet has been, and in part still is, maintained by many peoples, and men have remained contented under it. The only distinction between the Africans and the Asiatics on the one hand, and the Greeks, Romans, and moderns on the other, is that the latter know and it is explicit for them, that they are free, but the others are so without knowing that they are, and thus without existing as being free. This constitutes the enormous difference in their condition. All knowledge, and learning, science, and even commerce have no other object than to draw out what is inward or implicit and thus to become objective" (1995, 22).

Now, in view of the historical development since Hegel's time, it cannot be denied that the European intellectual form has in fact become dominant on a world-historical scale (even if today the specifically US-American form of science already seems to be outstripping this tradition). But can this result of European imperialism really be regarded as

the expression of a universal reason that is realizing itself in world history? Is this world-historical unity of science not in fact only the result of the repression of culturally specific alternatives? In short, is anyone who unhesitatingly speaks of the world history of science today not rightly suspected of indulging in the Eurocentric optimism of progress of the time before the First World War, the apologetic character of which has long since been unmasked, and thus of falling behind contemporary standards of critical reflection on the history of science?

There are undoubtedly good reasons for regarding Hegel's conception of the universal unity of the scientific spirit as irredeemably outdated. But the usual self-assurance that we have far surpassed systemic developments such as Hegel's is nevertheless a double-edged matter. From the point of view of the modern individual sciences, theories of the interrelation of the sciences appear to be at least scientifically irrelevant, for such theories obviously do not form a necessary precondition for scientific productivity. Of course, this irrelevance means first of all that the connection between the sciences is not subject to intra-scientific reflection, which, however, means in turn that naive ideas about this connection tacitly determine the self-understanding of the sciences, ideas that can be read, for example, in the usual justifications for requests for research funding, or that belie an implicit belief in progress, which can be seen in the fact that the individual scientist usually considers themselves as a member of a meaningfully coordinated whole based on the division of labor. The persistence of such naïve ideas has the further consequence that the metatheoretical explanations of interrelations between the sciences that one finds in the history and philosophy of science, conducted from this single-science perspective, produce results that put even the most overstretched Hegelian ideas in the shade.

Rudolf Carnap, for example, said that he had succeeded in integrating the individual sciences into one overall science. Through "epistemological analysis" he had found a unified conceptual system for all sciences. "[I]t is in principle possible to place all concepts of all the areas of science into this system, that is to say, they are reducible to one another and ultimately to a few basic concepts" (Carnap 1969, 308). "By placing the objects of science in one unified constructional system, the different "sciences" are at the same time recognized as branches of the one science and are themselves brought into a system" (288). It is easy to imagine that such a programme cannot be carried out without violence. Carnap believed that he could eliminate the problems of the theoretical tradition he ignored by "purifying the epistemology of pseudo-problems."

Carnap showed himself to be armed against any contradiction. His book on "pseudo-problems" ends with a tabular overview of the only possible objections to his system in his view and the following request: "Whoever wishes to contradict the indicated position […] must take one of the following viewpoints; our reply […] is given in each case. […] For the sake of clarity, all critics are requested to admit explicitly to one of these viewpoints" (341–343).

Admittedly, the sciences have adopted Carnap's system just as little as they have adopted other comparable designs from the sphere of analytical or constructivist scientific theory. Indeed, pluralist or relativist approaches seem to be far better able to depict the real state of the sciences than positions that counterfactually assert or demand a unity of science that is difficult to observe. We recall here the fascination that Thomas S. Kuhn aroused with his thesis that the history of science shows that unity and mutual understanding can only ever be achieved to a limited extent through agreement on a common paradigm. The bitter debate surrounding this thesis makes the dilemma clear: anyone who takes a meta-theoretical approach to the current scientific situation and its development seems to be faced with the difficult alternative of either postulating a unity of the sciences, which they themselves will not be able to achieve, or renouncing a universal scientific claim to truth.

In view of this dilemma, a general scepticism about science is spreading and is even becoming—what a triumph of scientific pluralism—an internationally recognised scientific position. We refer here, for example, to Paul Feyerabend, enfant terrible of the scientific establishment.

Now, no serious consequences are to be expected from this questioning of science within the academy. The threat to which science as a whole is exposed, especially in recent times, comes not only from professional critics, but also from the arguments of critics outside scientists' own ranks. It is perhaps these arguments that make clearest of all the real world-historical situation of science. We will therefore briefly recall the most important of them.

1. Science is accused of being largely responsible for the fact that the exploitation of nature today has assumed such proportions that it threatens to destroy the natural basis of human life. As a brief look at the "Global 2000" report commissioned by the Carter administration shows, we are indeed living in a situation in which the quantitative exploitation of nature is turning into a destructive quality on an unprecedented global scale, and there is no question that this would not be possible without the extensive industrial ap-

plication of scientific knowledge. Furthermore, the sciences involved, as individual sciences, are obviously not in a position to adequately thematize this qualitative change in any comprehensive way. The abstract nature of the individual sciences appears to be the cause of the crisis, and the seemingly natural division of labour among the sciences—which determines their productivity—ensures the irreversibility of this abstract character. This line of criticism therefore often sets up immediate experience as a counter-model to abstract science, and proposes to remedy the situation by reconnecting the sciences to the sensory referents of a supposedly natural life world. From this perspective, the natural context is seen as a system existing in equilibrium—in a certain sense in predetermined harmony—as long as it is not destroyed by human intervention.

2. Science is reproached for the fact that its abstract nature usually destroys the livelihoods and development prospects of Third World countries by integrating them into cycles of industrial production and imposing modern technologies that are themselves produced using scientific knowledge. On this view, importing industrial products and increasing productivity in individual sectors of production through the transfer of industrial technologies strips away the pre-economic and economic foundations of the comparatively unproductive system of traditional domestic reproduction without offering any alternative. The rapidly growing slums of the big cities in the Third World testify to the fact that plastic containers, industrially manufactured textiles and so on can destroy whole areas of small-scale craft and peasant production in one fell swoop, without even opening up the option of waged work to those affected. An extreme example, to which, for the umpteenth time and yet so far in vain, international organizations have recently drawn attention with their resolute condemnation, perhaps illustrates the problem most clearly. A valuable source of life that is available "free of charge" is being ruthlessly cut off in order to secure the sale of goods. We are referring to the importation of industrially produced baby food, supported by a criminal advertising campaign, into poor countries, which has led to babies being prematurely weaned resulting in deteriorating health, malnutrition, and a drastic increase in infant mortality. As this example demonstrates, this particular reproach actually strikes the individual sciences directly or indirectly involved at the core, because it is completely impossible within their framework to influence the conditions under which their results are used, or even to reflect on them scientifically.

3. Science is accused of being deeply involved in an uncontrollable process of optimizing the means of military conflict, resulting in the abolition of the natural limits once imposed on humanity's self-destruction. The ratio between military and non-military research budgets shows the extent of science's involvement in the constant improvement of weaponry. Meanwhile it is no longer disputed that the means of destruction modern weaponry provides have fearfully surpassed any possible purpose of warfare. Unchecked

> by scientific reflection or political transparency, science is trapped in a cycle of further development of weapons systems, which constantly forces a further increase in the potential for destruction, making the risk of humanity's self-destruction ever more incalculable. Let us not forget that current efforts to develop and install first-strike weapons invalidate the global military concept of mutually assured destruction, which has prevented the outbreak of nuclear war. According to this principle, only first to use such weapons has a chance—albeit a minimal one—of survival. If, based on the current stage of development of weapons technology, it was impossible to prevent a second strike, one could perhaps still convince oneself that the constant optimization of weapons would increase the likelihood of mutually assured destruction and thus prevent a world catastrophe. The most recent weapons development shows, however, that the constant improvement of weapons increasingly and foreseeably makes triggering a catastrophe into a logical military necessity. The belief that a high level of scientific competence can keep control of these developments becomes a credo qua absurdum when all strategies of calculated risk are undermined by the massive deployment of scientific and technical intelligence. Faith in the sensible coordination of the work of the individual sciences paves the way for the implementation of world-historical irrationality. On this view, it is understandable if techno-scientific civilization is perceived as a threat to the species, and the scientific spirit as the epitome of the crisis of the times.

Whatever might be said about the individual arguments presented here, the critique of science from the outside makes its real situation in world history clear. At the same time, however, it demonstrates how inappropriate are attempts to discuss the unity of science—the historical and systematic connection of the individual sciences—from the perspective of science itself, for example epistemologically. Contrary to the prevailing self-conception that the sciences naturally produce, science is not autonomous, but is one moment in the process of reproduction of the species and can therefore only be understood as part of this process in its context and its developmental dynamics. One may object that materialist approaches to reconstructing the history of science assume in principle that scientific developments can only be explained if they are examined as a function of the specific division of labour of a given social formation. Within the limits of this lecture, it is not possible to prove the correctness of this basic assumption for the world-historical context of the history of science. However, in view of the present situation of science briefly offered here, it seems undeniable to us that a certain unity in the developments of the individual sciences becomes visible only in the context of their social functions.

Let us return to the starting point of our considerations and ask ourselves whether Hegel's conception of a world spirit encompassing world history and the individual sciences— perhaps particularly ridiculous in its outdatedness—must be classified seamlessly among the many recognizably inadequate attempts to solve the problem of the unity of the sciences from within science.

In answering this question, it may be helpful to briefly recall the passage in the preface to the *Phenomenology of Spirit* where Hegel describes the essential elements of a scientific revolution, a context that the meta-theorist Kuhn, for example, can only describe as a "paradigm shift" because of the processes of self-negation that actually take place in the history of science. We are referring to the passage in which Hegel describes his time as "a birth-time and a period of transition to a new era" (Hegel 1979, 3). "Spirit has broken with the world it has hitherto inhabited and imagined, and is of a mind to submerge it in the past, and in the labour of its own transformation. Spirit is indeed never at rest but always engaged in moving forward. But just as the first breath drawn by a child after its long, quiet nourishment breaks the gradualness of merely quantitative growth-there is a qualitative leap, and the child is born-so likewise the Spirit in its formation matures slowly and quietly into its new shape, dissolving bit by bit the structure of its previous world [...]. The gradual crumbling that left unaltered the face of the whole is cut short by a sunburst which, in one flash, illuminates the features of the new world. But this new world is no more a complete actuality than is a new-born child; it is essential to bear this in mind. When we wish to see an oak with its massive trunk and spreading branches and foliage, we are not content to be shown an acorn instead [...]. The onset of the new spirit is [...] the whole which, having traversed its content in time and space, has returned into itself, and is the *resultant-simple Notion* of the whole. But the actuality of this simple whole consists in those various shapes and forms which have become its moments, and which will now develop and take shape afresh, this time in their new element, in their newly acquired meaning [...]. Only what is completely determined is at once exoteric, comprehensible, and capable of being learned and appropriated by all. The intelligible form of Science is the way open and equally accessible to everyone, and consciousness as it approaches Science justly demands that it be able to attain to rational knowledge by way of the ordinary understanding; for [...] what is intelligible is what is already familiar and common to Science and the

unscientific consciousness alike, the latter through its having afforded direct access to the former" (6–8).

So, we see that Hegel, on the one hand, does not achieve the concept of a unity of science by emphasizing the abstract commonalities between the scientific systems of different branches and historical epochs. "[Philosophy's] element and content is not the abstract or non- actual, but the *actual,* that which posits itself and is alive within itself," and the movement of this real "constitutes what is positive [in it] and its truth," which "includes the negative also" (27). This means that Hegel sets himself the task of grasping the context of science as an inherently contradictory unity, the course whose development is marked by the alternation between times of universal progress and times of upheaval, or the "qualitative leap." In this development, an old false is not simply replaced by a new true, however. It is true that spirit "dissolves" its "previous world," but its "various shapes and forms" are suspended in the new, namely as "moments" that "develop and take shape afresh" in "their new element." "The True is the Whole. But the whole is nothing other than the essence consummating itself through its development" (6–7; 11). And finally, for Hegel, this development is not a process immanent to the sciences. It is true that the whole that develops is spirit for Hegel qua idealist. But this includes more than science in the usual meaning of the word. The "intelligible" as "common to Science and the unscientific consciousness alike" is its essential moment. Consciousness "justly demands" that the sciences, as "exoteric," as "equally accessible to everyone," be set in the context of an overarching reason directed to the world as a whole, because practical consciousness, science, and reason must form a concrete unity (7). For Hegel, philosophy has to stand up for this claim and not for the speculative "setting up of a world beyond" (Hegel 1991, 20). "Healthy human reason goes out towards what is concrete; the reflection of the understanding comes first as abstract and untrue, correct in theory only, and amongst other things unpractical. Philosophy is what is most antagonistic to abstraction, and it leads back to the concrete" (1995, 25).

Hegel thus thematizes the problem of the unity of the sciences from the perspective of a context that is comprehensive and concrete. "The task of […] philosophy is, however, summed up in taking as its object

the unity of thought and Being, which is the fundamental idea of philosophy generally" (Hegel 1955, 490).[2] And philosophy also has this concrete connection between thinking and being as its concrete historical object. For philosophy itself "stands in the most intimate connection with" the "external world history of its time" and "emerges [...] from its time [...]to [...] restore the totality that has torn time apart;" it is—to recall the familiar dictum from Hegel's Philosophy of Right—"its own time comprehended in thoughts" (Hegel 1986, 482; Hegel 1970, 120–122; Hegel 1991, 21).[3]

To return to the question posed at the outset, Hegel's conception cannot be classified among attempts to solve the problem of the unity of the sciences in a way that is immanent to science. The greatness and relevance of Hegel's insight that the unity of science can only be established in the comprehensive and concrete connection between thinking and being, in each case in a historically concrete way, only becomes clear if we take this idea materialistically, that is, if we take as a starting point the real development of the sciences in the context of the historical development of the reproduction of nature as mediated by the metabolism with nature, in which thinking and being are only moments. Philosophy as Hegel conceives it is a reflection of this connection. This dimension of philosophy, which is no longer fashionable today, must be retained, but in a materialist mode. Philosophy does not itself constitute this larger context, and its reflection of this context cannot mean that the world-historical crisis of scientific-technical civilization it describes can be cancelled or remedied merely by thinking it philosophically. Rather, reflection means visualizing the crisis form of the connection between the moments of the reproduction of the species—the objective irrationality inherent in coordinating and realizing the possibilities set by scientific knowledge. And the relevance of such philosophical reflection lies precisely in making the means of visualization available for the real, practical abolition of this world-historical irrationality.

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2. *Translator's note*: The Haldane-Simson translation reads 'The task of modern German philosophy', though I have omitted that qualification here, as it is not present in Hegel's German, which simply reads "Die Aufgabe der Philosophie…" The more recent Robert F. Brown and J.M. Stewart translation of this third volume of Hegel's lectures on the history of philosophy, published by the University of California Press in 1990, omits the introduction to the section on recent philosophy entirely.
3. *Translator's note*: The third volume of Hegel's lectures on the history of philosophy in German contains his introduction to the Berlin introduction to the lectures, written in 1820, as an appendix. This is not included in either of the existing English translations of the lectures. Translation my own. Hegel 1970 is unavailable in English. Translation my own.

The sciences represent individual powers of the species, they are partial moments, and the problem of their unity reflects the fact that the powers of the species form a natural connection that we do not fully control. The problem of unity is the problem of how, as a species, to control the mediation between these moments, and is thus subject to the historical question of the preconditions of such a mediation. The state of development of the sciences is bound to the degree of development of the respective powers of the species, but the unity of the sciences is bound to the degree to which these powers are socialized.

The impression that the crisis of civilization is caused by the sciences is therefore only an illusion. The disunity of science and the resulting irrevocability of the abstract nature of the individual sciences in realizing the powers they represent are only a consequence of the fact that the powers of the species are by and large subordinated to particular interests. In this situation, a reasonable critique of science is not primarily directed against science itself, but against the real-historical preconditions of its disunity.

The conditions for the practical abolition of these real historical preconditions are objectively present today. The prospect of socializing the powers of the species and, on this basis, mastering the real intermediary relationships between these powers are no longer merely utopian fantasies. On the contrary, the failure to realize these possibilities threatens the species with its annihilation, meaning not only the end of the world-historical progress of techno-scientific civilization, but possibly the end of world history itself.

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